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ABSTRACT

This study outlined an approach for analyzing the impact of changing resource levels on schools. The effects of declining resources in New York City high schools and the implications of the findings for school systems facing similar situations are investigated. The focus of the impact analysis was in the organizational domain: the services provided, the population served, and the technology used. The major findings of the analysis were that there were significant changes in the schools as a group in both mix of services and class structure. The changes were not haphazard, but were shaped by the characteristics of the pupils and schools. The analysis of the New York City high schools suggests a number of issues that administrators in other systems encountering declining resources should be prepared to deal with: (1) allocation of decisionmaking responsibility; (2) resource allocation procedures; (3) service standards; (4) collective bargaining procedures and legal restraints; and (5) distribution of burden. Priorities for future research are discussed. (Author/MK)

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THE IMPACT OF BUDGET CUTS: NEW YORK CITY HIGH SCHOOLS AND THE FISCAL CRISIS

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I. INTRODUCTION

Objectives of the Study

In recent years resource scarcity has emerged as a major public management concern. Schools, along with many other public organizations, have been faced with drastic cuts in their appropriations even though demand for their services has not diminished. An understanding of the precise impact of declining resources is essential if schools are to be able to compete effectively with other agencies for increasingly limited resources in the public sector and if equitable intra-district resource allocation is to be achieved.

The specific objectives of this study are: (1) to outline an approach for analyzing the impact of changing resource levels on schools; (2) to use this approach to investigate some effects of declining resources in the New York City high schools; and (3) to examine the implications of the findings for other school systems facing similar situations.

An Approach to Studying the Impact of Changing Resource Levels

The impact of changing resource levels can be studied from many perspectives. The focus chosen here is the changes made in organizational domain: the services provided, the population served, and the technology used (Levine and White, 1961; Thompson, 1967). An organization's domain at any given time is contingent upon a particular level of support from the environment. If the level of support changes, then some or all of the services provided, the population served, or how the services are provided must be adjusted to fit the new level of resources.

Not all aspects of public school domains can be changed to cope with a new level of resources. By law, the population served may not be altered, and, at least in the short run, basic instructional technology cannot be changed. Therefore, if the level of resources in a school changes, then the level of services has to change. There is more than one way to change the level of services, however. Schools provide more than one kind of service; therefore the services can all be changed proportionately the same, or some more than others -- that is the mix of services can remain the same or be changed. And, even if the basic technology cannot be changed, other aspects of how the services are provided can be. One is class structure -- the arrangement of a given number of teachers and pupils into classes. The class structure can be changed or left alone when the level of resources changes. The major concern of this study is whether a change in the overall level of services in schools does or does not lead to changes in the mix of services and class structure.

An analysis of the choices made with respect to mix of services and class structure provides a useful general overview of the impact of changes in resource levels on some important organizational characteristics of schools. Since it is ultimately the services and organizational structure of schools, not the level of appropriations, that determine educational quality, this type of analysis can be viewed as an important first step to understanding the link between financial resources and the quality of education. Bidwell and Kasarda (1975) have made a start at specifying the link between structure and performance. This study examines the link between financial resources and structure. It will be easier to resist budget cuts for schools if the impact on the quality of education can be demonstrated.

Analysis of domain changes as described here has the advantage of using data readily available to most school systems. Extensive interviews or other expensive data gathering techniques are not required. It is therefore particularly suitable for a first look at the impact of resource level changes. However, this type of study ignores many important aspects of the impact of budget cuts. For example, it does not examine the relative impacts on different types of pupils, or the effects on teacher morale, pupil motivation, attendance, dropout rates, and curriculum. Different kinds of studies are needed to determine these effects.

New York City High Schools and the Fiscal Crisis

The financial resources available to the New York City public high schools have declined substantially since the city's fiscal crisis began in 1975 (see Table 1). In 1974-75, the year before the crisis, there were .058 staff units per pupil.[1] As a result of two successive budget cuts for the 1975-76 and 1976-77 school years, the number of staff units per pupil declined 22 percent to .045. While modest increases followed for the next two years, in 1978-79 the level of staff units per pupil, at .049, was still 15 percent below the 1974-75 level.

The New York City high schools during this period provide an unusually good setting for studying domain change in response to changing levels of resources. Under the formula used to allocate resources among the high schools, all the schools receive virtually the same proportional loss or gain when total resources decrease or increase. This presents a rare opportunity to study the responses of a large number of similar

[1] The staff unit is the unit of allocation of resources from the central administration to the individual high schools. Total staff units for all schools is equal to the total personal service budget for all schools divided by the average teacher salary.

TABLE 1

RESOURCE AVAILABILITY -- ALL REGULAR HIGH SCHOOLS

	1974-75	1975-76	1976-77	1977-78	1978-79	% CHANGE 1974-75 to 1978-79
Total Staff units[a]	17,302	15,207	13,828	14,555	14,676	-15.2
October 31 register	299,788	306,226	309,362	302,213	298,974	- 0.3
Staff units per pupil	.058	.050	.045	.048	.049	-15.5
%Change from Previous Year						
Staff units	--	-12.1	- 9.1	5.3	0.8	
October 31 register	--	-2.1	-1.8	-2.3	-1.1	
Staff units per pupil	--	-13.8	-10.0	6.7	2.1	

Source: Based on New York City Board of Education, Comparative Analysis of the Organization of the High Schools for the Fall Term (issued annually).

[a]See text for explanation of staff unit.

organizations to the same stimulus.

Moreover, domain changes caused by changes in resource levels during the period studied can be readily identified. The changes were substantial, the organizations of the schools were relatively stable during the pre-cut period, and pupil characteristics remained relatively constant during the period under study.

Finally, some of the reasons for any observed variation can be explored. Variation in the responses among the schools is both possible and likely because the principals have wide discretion in allocating their allotments and because the schools differ considerably in their pupil and organizational characteristics. These differences provide an opportunity to study their role in shaping the responses to changes in the level of financial resources.

To analyze the domain changes caused by changes in resources levels, 92 New York City public high schools were studied using data for the school years 1974-75 to 1978-79. (Only schools recently opened or consolidated were excluded.) The empirical research addresses the following questions.

- What domain changes, if any, were made each year in response to changes in the level of financial resources?
- What were the differences among the schools in the responses?
- To what extent could the variation in the responses be explained by variation in the organizational and environmental characteristics of the schools?

II. THE RESPONSE TO CHANGING RESOURCE LEVELS

As explained earlier,even though the overall level of services must change in schools with resource level changes, changes in the mix of services and class structure are possible but not necessary. What should be expected when resources decline? Drawing upon previously published research on schools as complex organizations, on organizational change, and on behavior in situations of stress, a case can be made for predicting no change in the mix of services or class structure, and an equally convincing one for predicting change. (See Choy, 1979, for a detailed discussion of the arguments.)

The case for predicting no change rests on the strength of the forces inhibiting change. The prospects for significant change in any organization are inhibited by a tendency for the search for alternatives to be limited and by specific barriers at the implementation stage, including the high cost of instituting changes and resistance from affected individuals. It can be argued that the forces opposing change, which are strong in all organizations, are especially strong in large public schools, and are strengthened in a situation of budget cuts and under conditions of stress.

On the other hand, organizations are not impervious to change. A big enough budget cut can stimulate change in the mix of services and class structure as well as in the level of services. Furthermore a situation of budget cuts and severe stress may contribute to reducing the cost of change and make it easier to overcome vested interests. On this basis, change can be predicted.

In summary, theory does not tell us wiether or not change will occur. Empirical analysis will reveal what actually happened.

Mix of Services

The two major categories of services provided in the New York City high schools are: (1) instructional services, which include all classroom teaching; and (2) administrative and support services, which include the services needed to administer the schools and provide supportive services such as libraries and guidance counselling. To determine whether or not the mix of these services has changed with changing resource levels, changes in the proportion of resources allocated to them was examined.

Ideally, service level changes should be measured in terms of outputs. In the absence of adequate output measures, input measures, the numbers of full time equivalent positions devoted to each type of service, were used as indicators of the levels provided. The total number of instructional positions (IP) was determined from the number of periods of instruction actually provided. A full time teaching load is 25 periods a week; a school therefore has one instructional position for every 25 periods of instruction provided. The total number of administrative and support positions (ASP) was calculated as a residual, substracting IP from the total positions (TP).

To determine whether a policy of change or no change in the mix of services was adopted in a school, the change in the proportion of IP after each change in the level of resources was examined:

$$\Delta \%IP = \left(\frac{IP_2}{TP_2} \times 100\right) - \left(\frac{IP_1}{TP_1} \times 100\right)$$

where IP and TP are defined above and the subscripts 1 and 2 represent successive time periods.

A positive Δ%IP (that is, an increase in the proportion of instructional positions) indicates a change in mix of services to preserve instruction at the expense of administration and support. A negative Δ%IP (that is, a decrease in the proportion of instructional positions) represents a change to preserve administration and support. A Δ%IP equal or close to sero (that is, no change in the proportion of instructional positions) means no change in the mix of services.

The level of services, as measured by the total number of positions, declined substantially as a result of the budget cuts. In 1974-75, the last year before the budget cuts, the average school had 176.2 positions (Table 2). After the two budget cuts, the average had declined to 140.1, a loss of 20 percent. Even after two subsequent increases, the mean total positions, at 145.9, was still 17 percent below the pre-cut level. Enrollment had declined slightly by 1978-79 (see Table 1), but even on a per pupil basis the loss was 15 percent.

Table 2 also indicates, however, that the two types of services were not equally affected. Significant changes in the mix of services were made each year. The largest change was made in response to the first budget cut, with the proportion of instructional positions increasing by a significant 2.8 percentage points from 1974-75 to 1975-76. After that, smaller (although still significant) fluctuations occurred in both directions. The overall result was a significant increase in instructional positions from 70.9 percent in 1974-75 to 73.1 percent in 1978-79. In the schools as a group, then, instruction was preserved at the expense of

TABLE 2

MIX OF SERVICES

Mean	1974-75	1975-76	1976-77	1977-78	1978-79	% CHANGE 1974-75 to 1978-79
Positions[a]						
Instruction	126.2 (41.6)	115.7 (36.1)	103.3 (32.5)	106.5 (33.5)	107.4 (32.7)	-14.9
Admin. and support	50.0 (11.6)	40.2 (9.6)	36.8 (8.9)	37.1 (10.8)	38.5 (9.2)	-23.0
Total	176.2 (51.3)	155.9 (44.2)	140.1 (39.9)	143.5 (42.2)	145.9 (40.4)	-17.2
Percent Positions[a]						
Instruction	70.9 (4.0)	73.7 (3.5)	73.2 (4.0)	74.0 (4.2)	73.1 (3.7)	
Change in Percent Positions from Previous Year[b]						
Instruction	--	2.8* (11.6)	-0.5* (2.1)	0.8* (2.4)	-0.8* (2.9)	

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

[a]Standard deviations in parentheses.

[b]t-statistics in parentheses. *Indicates significant at .05 level.

administration and support.[1]

These averages hide considerable variation. In each period of change, in some schools instruction was preserved at the expense of administration and support, in others, administration and support preserved at the expense of instruction, and in still others both changed by approximately the same proportion.

Class Structure

Since the average teaching load is five classes a day, the number of classes that can be scheduled in a school per day is equal to the number of instructional positions multiplied by five. A change in the number of instructional positions, therefore, means a change in the number of classes. The number of classes, however, does not fix the class structure. For any given number of classes there is a tradeoff between class size and the number of classes a pupil can take: the more subjects taken per pupil, the larger the classes have to be.

$$\text{Classes per day} = \text{Number of pupils} \times \frac{\text{Average number of subjects taken per pupil per day}}{\text{Average class size}}$$

This relationship can be illustrated with a simple example. In a school with two teachers, each teaching only one period per day (that is, two classes scheduled for the whole school) and two pupils, the class structure could involve two pupils each taking two subjects with two pupils in each class,

[1] It is interesting to note that the mix of services in 1976-77 was not statistically significantly different from the mix in 1978-79. This suggests that at least some effects of budget cuts may persist even if resources increase again.

or each taking one subject with each pupil in a class alone:

$$2 \text{ classes} = 2 \times \frac{2}{2} \quad \text{or} \quad 2 \times \frac{1}{1}$$

When the number of classes per pupil changes, the change can be absorbed by either adjusting the average class size, adjusting the average number of subjects taken per pupil per day, or both.

Table 3 shows the class structure adopted in the schools as a group for each of the years being studied and the changes. The two budget cuts caused a statistically significant decline in the number of classes per pupil from .216 to .176. The schools as a group responded with a significant increase in average class size from 30.0 to 34.8 and a significant decrease in average number of subjects from 6.41 to 6.06. When the number of classes was somewhat restored the next two years, average class size was reduced to 33.0 and average number of subjects increased to 6.34, both significant changes. The net effect by 1978-79 was an average number of subjects not significantly below the pre-cut level, but a significantly greater average class size.

Given the way average class size and average number of subjects are related, it was possible to analyze for each school whether the changes in classes per pupil were adapted to by proportionately greater changes in average class size or average number of subjects. For any given decrease in classes per pupil (CP) the possible ways to change average class size (ACS) and average number of subjectstaken per pupil per day (ASPD) can be determined. In Figure 1, if point A marks the change in ACS required for no change in ASPD and if point B marks the change in ASPD required for no change in ACS, then the line AB represents all the combinations of changes

TABLE 3

CLASS STRUCTURE

	1974-75	1975-76	1976-77	1977-78	1978-79	CHANGE 1974-75 to 1978-79
Mean[a]						
Avg. class size	30.0 (2.3)	32.3 (2.4)	34.8 (3.0)	33.5 (2.2)	33.0 (2.3)	
Avg. no. subj. per pupil per day	6.41 (.58)	6.20 (.67)	6.06 (.64)	6.21 (.59)	6.34 (.65)	
Classes per pupil	.216 (.03)	.194 (.03)	.176 (.03)	.186 (.02)	.193 (.03)	
Change from Previous Year[b]						
Avg. class size	--	2.3* (12.4)	2.5* (9.4)	-1.3* (4.2)	-.5* (2.4)	3.1* (12.0)
Avg. no. subj. per pupil per day	--	-0.21* (5.8)	-0.14* (3.6)	0.15* (3.6)	0.13* (4.1)	-0.07 (1.6)
Classes per pupil	--	- .022* (14.5)	- .018* (12.4)	.010* (6.8)	.007* (5.5)	- .023* (12.4)

Source: Computed from data in New York City Board of Education, Organization of the High Schools, using 92 schools.

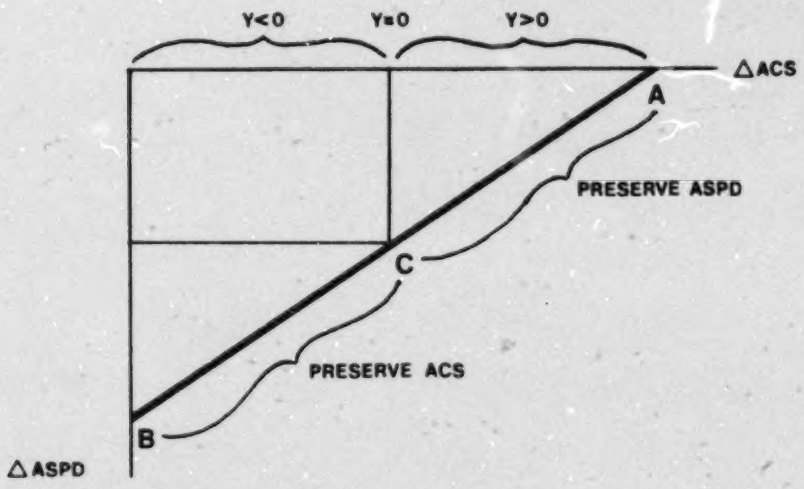
[a]Standard deviations in parentheses.

[b]t-statistics in parentheses. *Indicates significant at .05 level.

in ACS and ASPD associated with a particular change in CP. Halfway between A and B is point C at which half the cut is absorbed by increasing ACS and half by decreasing ASPD.

FIGURE I

THE RELATIONSHIP BETWEEN CHANGES
IN ASPD AND ACS WHEN CP DECREASES



To determine how the cut was absorbed in a school, the percent deviation from the neutral position (C) was calculated:

$$Y = \frac{\left(ACS_{actual} - ACS_{neutral}\right) \times 100}{ACS_{neutral}}$$

Y thus represents the actual deviation as a percent of the total possible deviation in one direction.[1] If a strategy to preserve ASPD were used, then

[1]Note that values of Y greater than 100 or less than -100 are possible if ASPD should increase or ACS decrease in spite of a decrease in CP.

Y would be positive (with the changes falling between C and A in Figure 1), and if a strategy to preserve ACS were adopted, then Y would be negative (with the changes between B and C). If both ACS and ASPD were affected equally, then Y would be equal (or very close) to zero (point C).

These criteria for identifying responses apply only when CP decreases. When CP increases, the change is apportioned between increases in ASPD and decreases in ACS. The same method is used to calculate Y, but opposite signs for Y will be associated with each response. That is, if ACS is favored, Y will be positive, and if ASPD is favored, Y will be negative. Because the sign of Y has a different meaning depending on whether CP has increased or decreased, the relative emphasis on preserving ACS or ASPD has to be determined separately for schools with increases in CP and those with decreases.

Using the mean values of the average class size and the average number of subjects taken per pupil per day, for the schools with decreases in classes per pupil the actual change and the neutral positions were compared by computing Y for each year. To adjust to decline, in each period in the schools as a group relatively more emphasis was put on increasing class size than decreasing subjects taken (Table 4). Taking the 86 schools that had decreases in classes per pupil from 1974-75 to 1978-79, the increase in average class size of 3.1 was 75 percent greater than it would have been had equal cuts been adopted.

The first year that resources increased, 73 schools had increased classes per pupil, and as a group relatively more emphasis was placed on decreasing average class size than increasing average number of subjects taken (although, as Table 3 shows, significant changes were made in both).

TABLE 4

RELATIVE EMPHASIS ON PRESERVING
SUBJECTS VS CLASS SIZE

	1974-75 to 1975-76	1975-76 to 1976-77	1976-77 to 1977-78	1977-78 to 1978-79	1974-75 to 1978-79
Classes per pupil decreased					
No. of schools	88	86	19	27	86
Y	40*	47*	49*	74*	75*
Classes per pupil increased					
No. of schools	4	6	73	65	6
Y	---	--	28	7	--

Note: Y not computed for groups with fewer than 10 schools. *Indicates strategy to preserve subjects at expense of class size.

The second year there was a very close to equal emphasis on both.

Y was also calculated for each school individually. There was considerable variation in the responses among the schools each year.

III. EXPLAINING THE VARIATION

In spite of the many characteristics the New York City high schools have in common--all large public schools, headed by principals, staffed mainly with teachers, under the same central administration, allocated resources by the same formula, and subject to the same legal constraints--there was considerable variation among the schools in the responses to changing resource levels. This is not surprising. Thompson (1967) argues that administrative decisions are an outcome of the interaction between the characteristics of the decision makers and the constraints presented by the situation. Both the characteristics and the constraints varied among the schools. The schools were headed by individuals with different preferences, abilities, backgrounds, and training; their pupils had different patterns of ability, attendance, mobility, and diversity; and the schools were different sizes and had different mixes of services and class structures to start with. These differences can be expected to be among the causes of the observed variation in the responses.

Regression analysis was used to determine the extent to which the observed variation in the responses to changing resource levels could be explained by differences among the schools' organizational and pupil characteristics. No relevant data on administrator characteristics were available. It can be argued, however, that administrator preferences, at the very least, will be related to the characteristics of the pupils

they serve (see Choy, 1979).

Mix of Services

Instruction is the core activity in schools, and the acquisition of basic skills and knowledge has been identified as the priority of principals (Havighurst et al, 1970). Therefore it was expected that they would prefer to favor instruction at the expense of administration and support whether resources increased or decreased. In spite of this, certain pupil and school characteristics are likely to act as constraints affecting their ability to do so, and thus account for some of the variation in the responses. Specifically, it was hypothesized that the tendency to favor instruction would be strengthened by the following characteristics:

1. Low turnover. High pupil turnover generates a need for administrative and support services to keep track of the flows of students and to assist new arrivals. Therefore low turnover is likely to make it easier to preserve instruction.

2. Diversity. With a diverse pupil population there is someone to defend each aspect of the instructional program, making it hard to eliminate anything and thus increasing the likelihood that instruction will be preserved at the expense of administration and support.

3. Community pressure. School clients are likely to prefer that instruction be preserved over administration and support. Therefore, the stronger community pressure, the greater the tendency to preserve instruction is likely to be.

4. Low percent resources for instruction. Because all schools require some administrative and support services, in schools with a high percent instructional services in the pre-change period, it is likely to be difficult to make further increases.

5. Large size. A minimum administrative and support staff is required regardless of school size. The smaller the school, the more likely it is to be close to that minimum. In large schools administration and support can be cut more easily, thus making it easier for instruction to be preserved in them.

6. Vocational schools. To meet both academic and vocational requirements, pupils in vocational schools have to take more subjects per day than those in academic schools. Also, class size is harder to increase in vocational schools because of the larger proportion of shop classes that for safety reasons have to be limited in size. Together these constraints make it harder to cut instruction in vocational schools than academic ones.

The dependent variable in the regression equations was the change in mix of services as measured by the change in the percent instructional positions from t=1 to t=2. The independent variables, measured at t=1, and their operational measures are listed in Table 5 and the results of the regressions in Table 6.

TABLE 5

INDEPENDENT VARIABLES FOR REGRESSION EQUATIONS[a]

Pupil Characteristics	
Turnover	Turnover rate (TURN). Average of the rates of admission and departure, which are the number of admissions and departures as percents of the average daily register.
Diversity	Diversity index (DIV). An index ranging from 0 to 50. For schools with 50% or fewer of their pupils 2+ years below grade level in reading, DIV = the actual percent. For schools with the percent greater than 50, DIV = 100-actual percent.[b]
Community Pressure	Percent poor (POOR). Percent of pupils eligible for free lunches because of low family income. This was used as a proxy for community pressure on the assumption that the higher the income of the population, the more likely it would be able and inclined to exert pressure.
Ability and Motivation	Achievement (ABIL). Percent of pupils 2+ years below grade level in reading. Thus a low value for ABIL indicates a high level of achievement.
School Characteristics	
Mix of Services	Percent instructional positions (PIP). Number of full time equivalent teaching positions as a percentage of total positions.
Average Number of Subjects Taken	Average number of subjects taken per pupil per day (ASPD). The average number of classes attended per day by pupils in a school.
Proportion of Large Classes	Percent regular subject classes larger than 40 pupils (CL40).
School Size	Total positions (TP).
Type of School	Dummy variable (VOC). Dummy variable to distinguish between academic and vocational schools with vocational schools = 1.

[a]Source of data on pupil characteristics: New York City Board of Education, School Profiles; on school characteristics: New York City Board of Education, Organization of the High Schools, both published annually.

[b]Since true diversity cannot be described with only one number, this measure has important limitations.

TABLE 6

REGRESSION RESULTS: CHANGE IN MIX OF SERVICES

		PUPIL CHARACTERISTICS			SCHOOL CHARACTERISTICS			SUMMARY STATISTICS	
	CONSTANT	TURN	DIV	POOR	PIP	TP	VOC	Adj.R^2	F
1974-75 to 1975-76	26.0	-.025 (.9)	.022 (1.3)	-.018 (1.8)	-.32* (4.3)	.001 (.1)	1.71* (2.6)	.33	8.5
1975-76 to 1976-77	24.2	-.081* (2.2)	-.022 (1.0)	-.011 (.8)	-.36* (3.7)	.027* (3.4)	2.40* (3.0)	.18	4.3
1976-77 to 1977-78	31.8	-.028 (.7)	-.015 (.7)	-.019 (1.6)	-.45* (4.9)	.019* (2.0)	5.62* (6.6)	.46	14.1
1977-78 to 1978-79	28.3	-.169* (4.9)	.022 (1.0)	.003 (.3)	-.38* (5.1)	.014* (2.0)	-2.57* (2.8)	.58	21.9
1974-75 to 1978-79	44.9	-.147* (4.0)	-.001 (.1)	-.010 (.8)	-.59* (6.1)	.013 (1.6)	2.28* (2.7)	.42	11.9

Source: Estimated from the equation: $Y = b_0 + b_1 TURN + b_2 DIV + b_3 POOR + b_4 PIP + b_5 TP + b_6 VOC$, where: Y = change in percent instructional positions; TURN = turnover rate; DIV = diversity index; POOR = percent free lunch eligibles; PIP = percent instructional positions; TP = total positions; VOC = dummy variable, vocational schools = 1.

Note: Numbers in parentheses are t-values; *denotes significant at .05 level.

A significant portion of the variation in the response to change in resource levels could be explained each year, with school characteristics explaining more of the variation than pupil ones. As expected, the lower the percent instructional positions before the change and the larger the school, the greater the tendency to preserve instruction. Also as expected, vocational schools were more likely to preserve instruction.

Only one pupil characteristic, the turnover rate, was significant. As predicted, a low turnover rate was associated with a tendency to preserve instruction. The coefficients for the percent poor (the proxy for community pressure) had the expected sign, but only in the first year was the coefficient significant even at the .10 level. In the first and last periods the diversity index had the expected sign, but was not significant. Perhaps if better measures of diversity and community pressure were available a significant relationship might be found.

Class Structure

Although there is no educationally based reason for expecting a general tendency to preserve the number of subjects taken as opposed to class size, the resource allocation formula for the New York City high schools contains an incentive to adjust to budget cuts by doing so. According to the formula, the resources received vary with the average number of subjects actually taken, but are not affected by the actual average class size. Thus if subjects taken are reduced to adjust to a budget cut, the next year's allocation will be lower than if the number of subjects is maintained and the cut is absorbed by increasing the average class size. Average class size cannot be increased without limit, however, since the teachers' contract specifies maximum class size limits of 34 for subject

classes, 28 for shop classes, and 50 for music and physical education classes.

In spite of the incentive to preserve subjects taken at the expense of class size, certain pupil and school characteristics are likely to affect the actual tendency to do so. Specifically, it was hypothesized that when resources decrease the likelihood of preserving subjects would be increased by the following characteristics:

1. High proportion of pupils with high ability and motivation. Pupils with high ability and motivation are likely to prefer to maintain the number of subjects taken even if it means larger classes. Teachers of pupils with low motivation are likely to resist large classes in the interest of smoothly functioning classes, which means subjects must be reduced.

2. Low turnover. With low turnover pupil needs can be predicted more accurately, making it possible to plan for classes close to the maximum sizes allowable (and thus absorb resource cuts by increasing class size). When turnover is high, the uncertainty makes it easier to reduce subjects taken than risk problems with oversized classes.

3. Low diversity. When diversity is low, many pupils will be taking the same courses, making it easier to fill each class to the maximum. When diversity is high, it is harder to increase class sizes, forcing a decrease in the number of subjects taken when resources decline.

4. Low average number of subjects taken. When the average number of subjects taken per pupil per day is low to start with, it is likely to be preserved.

5. Low proportion of large classes. When a school has a low proportion of large classes it is not difficult to absorb a decrease in

resources by increasing class size, thus making a strategy to preserve subjects easier.

6. Vocational schools. Since vocational pupils have to take more subjects, a strategy of preserving subjects is more likely to be necessary.

Regression equations were estimated for schools with decreases in the number of classes per pupil. The dependent variable was the percent deviation from equal cuts (from t=1 to t=2) in class size and subjects. (The larger the dependent variable the more pronounced the tendency was to preserve subjects.) The independent variables and their operational measures are listed in Table 5 and the results of the regressions in Table 7.

A significant portion of the variation in the response to decreased resources could be explained for each period. The first year, as expected, low turnover and a low average number of subjects were associated with a strong tendency to preserve subjects. The second year, in addition to these, high ability and motivation and the dummy variable also had the expected effects. Curiously, a high proportion of oversized classes was also associated with a tendency to preserve instruction, not the expected relationship.

When the same equations were estimated for schools with increased classes per pupil for the two years following the budget cuts, none of the coefficients was significant. This suggests different explanatory factors must be found for situations of increasing resources.

IV. POLICY IMPLICATIONS OF THE FINDINGS

The major findings of the analysis of domain changes in the New York

TABLE 7

REGRESSION RESULTS: CHANGE IN CLASS STRUCTURE
FOR SCHOOLS WHERE CP DECREASED

		PUPIL CHARACTERISTICS			SCHOOL CHARACTERISTICS			SUMMARY STATISTICS	
	CONSTANT	ABIL	TURN	DIV	ASPD	CL40	VOC	Adj.R^2	F
1974-75 to 1975-76	612.6	-.38	-4.71*	.82	-74.1*	-.16	42.1	.15	3.6
		(.5)	(2.2)	(1.0)	(2.6)	(.1)	(1.1)		
1975-76 to 1976-77	891.0	-2.11*	4.30	-2.15	-131.6*	5.19*	185.5*	.20	4.5
		(2.4)	(1.8)	(1.8)	(3.6)	(2.2)	(3.8)		
1974-75 to 1978-79	1383.4	.39	-11.4*	.60	-174.8*	7.40	121.4*	.29	6.6
		(.4)	(4.2)	(.5)	(4.8)	(1.4)	(2.4)		

Source: Estimated from the equation: $Y = b_0 + b_1ABIL + b_2TURN + b_3DIV + b_4ASPD + b_5CL40 + b_6VOC$, where: Y = change in class structure; ABIL = percent 2+ years below grade in reading; TURN = turnover rate; DIV = diversity index; ASPD = average number of subjects per pupil per day; CL40 = percent subject classes greater than 40; VOC = dummy variable, vocational schools = 1.

Note: Numbers in parentheses are t-values; *denotes significant at .05 level.

City high schools in response to changes in the level of financial resources were: (1) that in the schools as a group there were significant changes in both mix of services and class structure, but there was wide variation among the schools; and (2) that the changes were not haphazard, but were shaped by, among other factors, the characteristics of the pupils and schools. An important question is: Can similar findings be predicted for other school systems?

New York City high schools have certain characteristics in common with most other large public school systems--for example, the same general goals and basic technology, similar authority structures, and labor forces with similar training. These similarities provide a basis for predicting similar findings elsewhere. There may, however, also be important differences. For example, in the New York City high schools the principals have considerable authority over resource allocation, the formula contains an incentive to make a certain response, and the teachers' contract imposes specific constraints. These circumstances may have importantly influenced the responses, but, while not necessarily unique to New York City, they may not be found everywhere. The confidence with which findings similar to those in New York City high schools can be predicted for other school systems depends on how different they are with respect to these characteristics.

However, regardless of the extent to which the findings can be generalized, the analysis of the experience of the New York City high schools suggests a number of issues that administrators in other school systems faced with declining resources should be prepared to deal with. These are discussed below.

Allocation of Decision Making Responsibility

The division of the responsibility for adjusting to resource declines between the central administration and the individual schools deserves careful attention. The finding of wide variation among the high schools in the responses and the fact that the variation was at least partly explainable by differences in pupil and school characteristics suggests that assigning primary responsibility to the school level may be an effective way to take into account local needs.

Resource Allocation Procedures

If the decisions about mix of services and class structure are made at the school level, resources must be allocated to the schools in a way that encourages responses appropriate to individual situations. Resource allocation procedures must therefore be scrutinized. The New York City high school experience suggests that resource allocation procedures that work adequately during periods of budgetary stability or growth do not necessarily serve well in periods of decline.

To illustrate, take the incentive to preserve the number of subjects taken in the resource allocation formula. It may not affect behavior with stable or increasing resources, when resources only decline if the pupils elect fewer subjects than the year before. During periods of budgetary decline, however, the incentive to preserve the average number of subject per pupil per day could encourage inappropriate behavior. For example, in schools with a large proportion of pupils with low ability, where small class size may be needed more than a large number of subjects, the administrators may increase class size anyway, not wanting to compound

their losses by reducing the number of subjects taken, even though that may be more appropriate from an educational point of view.

Service Standards

Many school systems have input or service standards. In the New York City high schools, for example, the central administration policy is to encourage all pupils to take at least six subjects per day. The teachers' contract sets further standards by specifying maximum class sizes. Continued budget cuts can seriously jeopardize the ability to meet these standards, especially in those schools with the lowest resources per pupil. (There have always been disparities in the level of resources per pupil among the New York City high schools, largely because of variation in the average number of subjects taken.) A substantial number of the high schools had both average class sizes over 34 and average numbers of subjects taken below six.

This raises the issue of whether resources should be transferred from schools in better positions to those in the greatest trouble. In other words, should some minimum average number of subjects and maximum average class size or a minimum level of resources per pupil be guaranteed to all schools? The question is not easily answered. If cuts were to continue for a long time, this policy would eventually lead to an equalization of resources and identical class structures for all the schools. This, in turn, would reduce the ability of the schools to reflect their pupils' characteristics. In the future, if cuts continue, a key policy issue will be how to balance the need to provide a minimum level of services in all schools with the need to allow for diversity.

Collective Bargaining Agreements and Legal Constraints

In New York City the teachers' contract specifies maximum class sizes and state law determines, among other things, the length of the school year. From an educational point of view there is nothing magical about these numbers, and some may argue that they unnecessarily limit flexibility in dealing with budget cuts. In the future, negotiators and lawmakers should keep in mind the potential consequences of any agreements or laws under situations of declining resources.

It should be noted, however, that collective bargaining agreements and legal requirements may actually improve the schools' positions relative to other public agencies. If certain services or ways of providing them are legally mandated, this may protect the schools from budget reductions.

Distribution of the Burden

Both teachers and pupils are likely to suffer when budgets are cut, but attention should be paid to ensuring that the burden is equitably shared. If, for example, all of the decline in the number of classes per pupil were absorbed by decreasing subjects taken as opposed to increasing class sizes, the burden would be resting almost entirely on the pupils. Situations such as this should be avoided.

Priorities for Future Research

Two research priorities are suggested by this study. One is the impact of budget reductions on the quality of education. A clear understanding of these effects will put schools in a better position to resist budget cuts. The other is the evaluation of intra-district resource allocation policies to determine whether they are equitable in situations of declining resources as well as stable or increasing ones.

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